

Weekly Report

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2017.11.20 - 2017.11.26

1 Projects

1.1 DeepVis Revision

The first draft was sent to Wang Wei and Prof. Tung on Monday. They replied that they would send it back in a week.

1.2 Predictive Traffic Flow Analysis

- **New Models** K -NN prediction model is implemented. The results are generated and stored in our database now.
- **Related Work** This week I was mainly doing paper survey on traffic prediction and dynamic graph visualization. I have collected about twenty papers on these two topics. In the next week I will start writing the section of related work.
- **Interface Implementation** I discussed with Chentao Ye about the web interface framework. Currently we are studying React and G2 3.0 for implementation. Chentao is currently studying adding a map view with Leaflet.js.

1.3 Misc.

- Prepared the report of *Considerations on Visual Comparison* on Friday's weekly seminar.

Table 1: Plan for the Next Week

Target Date	Project	Progress	Problems
12.5	DeepVis Revision	The first draft version is finished.	Waiting for revision
2018.01.15	Predictive Traffic Network Flow Analysis	Necessary prediction results are generated.	Related works

2 Paper Reading

2.1 Considerations on Visual Comparison (InfoVis 2017)

I gave a lecture of this paper [1] on Friday. The main purpose of sharing this paper is that in our predictive traffic flow analysis project, a main task is to comparing 1) prediction results of multiple time intervals from a single model, and 2) prediction results from multiple models. Thus, I consider the framework of comparison design can refer to this paper.

2.2 Low-Level Components of Analytic Activity in Information Visualization Robert (InfoVis 2005) and Task Taxonomy for Graph Visualization

These two papers [2, 3] propose task taxonomies of basic analytical tasks in information visualization. Like the paper mentioned in Section 2.1, this type of summarization is difficult to understand if you are just a beginner in vis without any experiences on designing visualization applications. However, for senior PhD students such as me, these paper are more precious because comprehensive summarization gives you a chance to re-think what you have done and miss in the past years of "visual designing". Take comparison tasks as an example, those details and levels help me handle the writing of designing comparison features in my system because in my past papers I even have no idea of writing these points.

2.3 An Analysis of Machine- and Human-Analytics in Classification (VAST 2016)

This paper [4] adopted a study of tracing technical and cognitive processes of classification by human users and ML models. Typical rule-based ML models like decision trees use information theory or some automated feature selection strategies to construct trees and selecting important features. However, human users sometimes can apply “soft knowledges” during the construction process of classification rules, which may gain better results than algorithm-based decision trees.

I think this paper gives a good example of building a bridge between traditional machine learning theories and human knowledges. There should be a way of combining non-interpretable expert knowledges in several traditional commonly-used algorithms to improve what we have already got with automated approaches.

2.4 Clustervision: Visual Supervision of Unsupervised Clustering

This paper [5] presents a similar application scenario of my project, where clustering results from multiple models are listed and analyzed. The authors designed a suite of views to show differences among different models and support visual comparison based on users’ requirements.

From a general perspective, we all focus on analyzing prediction results of multiple predictive models. That’s to say, the core contribution of our project is to provide a visual comparison interface of flow prediction methods. I think the arrangement of analytical logics and sections of this paper are what I deserve to learn.

References

- [1] M. Gleicher, “Considerations for Visualizing Comparison,” *IEEE Transactions on Visualization and Computer Graphics*, vol. 24, no. 1, pp. 413–423, 2017.
- [2] R. Amar, J. Eagan, and J. Stasko, “Low-level components of analytic activity in information visualization,” *Proceedings - IEEE Symposium on Information Visualization, INFO VIS*, pp. 111–117, 2005.
- [3] B. Lee, C. Plaisant, C. S. Parr, J. D. Fekete, and N. Henry, “Task taxonomy for graph visualization,” *Proceedings of the 2006 AVI workshop on BEyond time and errors: novel evaluation methods for information visualization*, pp. 1–5, 2006.
- [4] G. K. L. Tam, V. Kothari, and M. Chen, “An Analysis of Machine-and Human-Analytics in Classification,” *IEEE Transactions on Visualization and Computer Graphics*, vol. 23, no. 1, pp. 71–80, 2017.
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